

REMARKS:

Claims 95-109 are currently pending in the application. Claims 95-109 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,409,453 to Smith ("Smith"). Claims 110-116 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,409,453 to Smith in view of U.S. Patent No. 5,166,487 to Hurley et al ("Hurley").

Rejections Under 35 U.S.C. § 102(b)

4. Claims 95-109 stand rejected under 35 U.S.C. § 102 (b) as being unpatentable over U.S. Patent No. 4,409,453 to Smith.

The Examiner states that "Smith discloses in the specification and Figs. 1-18 an invention in the same field of endeavor as applicant's invention and as described in applicant's claims 95-109 (note the Figs. [i]n Smith are disclosed with Roman numerals but have been reference[d] below using corresponding numbers 1-18). In particular, Smith shows a system and method of speed cooking a food product with gas comprising the steps of: providing a housing (1) defining a cooking chamber, providing a first means (any one of 80, Figs. 2 and 3 or 124, Fig. 8) for directing gas within the cooking chamber and a second means (any other adjacent nozzle/opening 80, Figs. 2 and 3 or 124, Fig. 8). Each of openings (80 or 124) is disposed above the food product for directing gas above the food product. Gas from the openings is provided in the form of jets (81). As shown particular[ly] in Fig. 8, a first gas jet (81b) and a second gas jet (81c) are provided to strike a food product (P) and are considered to collide turbulently in close proximity to a surface of the food product to desirable enable 'very rapid heat transfer and very rapid water vapor removal from the surface of the product' (see col. 10, lines 45-51)."

The examiner provided applicant with a Segment of Fig. 8 of Smith and the examiner added an arrow and textual insertion to Fig. 8. Examiner states that "The following is a segment of Fig. 8 of Smith to further illustrate what the examiner considered to be 'turbulently colliding' gas flows' (emphasis added by applicant). "Further, the examiner notes that Smith expressly notes that jets (81) when striking a solid

surface will be transformed into a "turbulent mushroom shaped pressure area" (se col. 11, lines 6-11)."

The examiner notes that "While this discussion is in the context of the jets striking the bottom of the food product, the examiner considers that a person of ordinary skill in the art would recognize that the 'turbulent mushroom shaped pressure area' would also result on the top of the food product (as shown for instance in Fig. 8 of Smith)."

Applicant respectfully disagrees. Although the examiner considers Smith to teach turbulently colliding airflow to perform cooking, Smith actually teaches away from turbulently colliding airflow.

Smith teaches cooking of food product by "discrete jets of heated high velocity air" which are "moved across the surface of a product to provide rapid heating" (col. 4, lines 18-20). Smith is replete with references to discrete columnated jets of air. For example, see Abstract wherein "spaced discrete high velocity jets of heated air to impinge against exterior surfaces of the food product" are described.

The invention of Smith requires that jets/nozzles be of a proper size and proper spacing (col. 3, lines 27-32). The Smith invention requires that jets (81) be properly spaced such that "discrete columnated jets of air are formed to impinge upon the surface of the product, said jets being spaced such that return air passes between the jets in a pattern so that one jet does not sweep under another jet as air returns to a blower for circulation over a heating element." (emphasis added by applicant). Applicant additionally directs the examiner's attention to Fig. 1 of applicant's application wherein applicant's Fig. 1 depicts jet impingement of inventions similar to Smith. Prior to applicant's invention, impingement cooking utilized discrete columnated jets of air in order to impinge against a food product surface, thereby cooking the food. Applicant's invention specifically teaches away from impingement cooking.

Turbulent mixing of airflow(s) is detrimental to the invention of Smith and is to be avoided. Smith insures return gas flow will not be impeded by utilization of proper spacing of nozzles/jets and proper sizing and spacing of return air paths. Smith describes

(col. 4, lines 18-20; col. 10, lines 62-68) jets of high velocity air moving across the surface of a food product. Smith also describes movement of the food product relative to the discrete jets (col. 9, lines 43-45). Without movement of either the jets relative to the food product or the food product relative to the jets, even cooking would not be possible. An undesirable "polka dot" browning (scorching) pattern results on the surface of the food product and indeed, one of the drawbacks of impingement cooking sought to be overcome by applicant's invention is cooking without the scorching effect and without moving either the food product relative to the jets or the jets relative to the food product.

Throughout Smith one finds references to "sweeping jets", "sweeping airflow" etc. Because the Smith invention produces columnated airflow and the undesirable polka dot effect, a motion of either the jets or the food product is necessary. No such motion is necessary for applicant's invention and indeed one of the advantages of colliding the airflow with itself of applicant's invention is the elimination of mechanical means to "clean up" the negative effects of impingement style cooking.

The examiner states: "As shown in particular in Fig. 8, a first gas jet (81b) and a second gas jet (81c) are provided to strike a food product (P) and are considered (by the examiner) to collide turbulently in close proximity to a surface of the food product to desirable enable very rapid heat transfer and very rapid water vapor removal from the surface of the product" (col. 10, lines 45-51)."

However, the examiner has improperly and incorrectly combined text, and thereafter rejected applicant's claims based upon an argument that is not taught in Smith. See column 10, lines 45-51 wherein is described:

"As illustrated in Figure VIII, high velocity jets 81 impinged against the upper surface of an irregular shaped product P to provide very rapid heat transfer and very rapid water removal from the surface of the product. It should be appreciated that the sweeping air jets 81 provides relatively uniform heating for surfaces of odd shaped food products."

Later in the specification Smith discusses the effect of airflow contacting a solid surface such as the bottom of a tray and further describes, (col. 11,

lines 6-10):

"It should further be appreciated that sweeping pressure jets 81 strike solid surfaces, such as tray T, such that the streamlined jet 81 is transformed into a turbulent mushroom shaped pressure area which effectively heats the underlying surface of any irregular object."

The examiner has incorrectly combined the two paragraphs into a single teaching that is nowhere taught in Smith. Column 10 lines 45-51 describe high velocity jet impingement against the upper surface of a food product. However, Column 11, lines 6-10 describes the effect of jet 81 impacting a solid surface such as the bottom of a tray and the resulting effect of such impact. The result is the **transformation** of an impingement jet into a "turbulent mushroom shaped pressure area". Smith merely utilized the word "turbulent" to describe the transformation of discrete columnated airflow into a "turbulent mushroom shaped pressure area". The examiner apparently picked up on the word "turbulent", and applied said term to the two dimensional Fig. 8 and assumed, incorrectly, a turbulent collision of airflow--which is nowhere taught by Smith.

Of critical importance to Smith is the spacing of jets 81 and the return paths 80 that allows for unimpeded airflow back to the blower and heater.

Again, restating the previous paragraph, the spacing of the jets 81, and the return air passages 80 are **critically important** for operation of the Smith invention, and this spacing requirement is referenced throughout Smith: (See col. 10, lines 45-51 describing the effect of high velocity sweeping jets impinging against the surface of a food product, creating very rapid heat transfer and very rapid water removal. Jets 81 are spaced apart to facilitate return of airflow; col. 3, lines 28-29 "...jets are of proper size, spacing; col.4, lines 40-43: "...said jets being spaced such that return air passes between the jets in a pattern so that one jet does not sweep under another jet as air returns to a blower for recirculation..."; column 8, lines 18-24: "The jets are arranged in pattern such as that shown in FIG. III so that air from one

jet can return to the blower without passing under another jet. The spacing between columnar or lineal jets is over twice the minimum width of the jet so that the proper return air space is provided between the discrete jets so that returning air does not interfere with successive jets".

When referring to the air return passages themselves, Smith states, (col. 48-63) "...passages 80 in jet plates 82 are not positioned in rows parallel to walls 4' and 6' of the cooking compartment 79. In the configuration of passages 80, illustrated in FIG. III if the drawing, the openings are spaced somewhat circumferentially about an axis spaced laterally from the center of jet plate 82 toward opening 44 formed in the rear end of air return duct 36 through which air is drawn by impeller 32. Passages 80 are spaced a distance of at least two times the diameter of opening 80 and a distance less than about 20 times the diameter of each passage 80. Such spacing permits flow of diffused air resulting from impingement of jets 81 against the surface of the food product through spaces between the jets to the air return duct 36 to prevent interference between the return air and the jets 81."

As can be seen from the previous descriptions, the spacing of air jets 81 and air return paths 80 is critically important to the Smith Invention. Therefore, the turbulent airflow illustrated by examiner's notation and examiner's arrow is undesirable and is to be avoided. As presented by the examiner, turbulent collision of airflow produces an inoperable device.

As referenced col. 8, line 59, the airflow that impinges against the food product becomes "diffused" as a result of impingement of jets 81 against the food product. The heated airflow has therefore been utilized and is now re-circulated for re-heating. Again, it is important that the return air does not interfere with jets 81 (col. 8, lines 60-65). Therefore not only is the examiner's example detrimental to the proper functioning of the Smith invention, with proper spacing and proper sizing of jets 81, this effect is to be avoided. And, as previously described, the avoidance of this effect is described throughout

the Smith reference. **The turbulence the examiner inserts into Smith Fig. 8 is an effect Smith taught to avoid.**

Although the examiner has added an arrow and a reference to "turbulently colliding" air to FIG. 8, the reference of "turbulently colliding" is not consistent with the text of Smith. See col. 11, line 8 wherein the word "turbulent" is described. At least two important differences exist between the examiner's notation and the text of Smith. First, Smith states "jet 81 is "transformed" (col. 11, line 8) into a turbulent mushroom shaped pressure area which effectively heats the underlying surface of any regular object". Therefore Smith does not teach the **collision of jets** of air but rather teaches the **transformation** of an impingement jet into a mushroom shaped pressure area. Therefore, there is no "turbulent collision" as referenced by the examiner. Only transformation of one type of jet (impingement) into another type (mushroom shaped pressure area).

Additionally, not only is there no turbulent collision of jets--the mushroom shaped pressure area is created by the effect of the food product being placed into a tray for cooking. Jet 81(d) impact against the bottom of the tray within which the food is placed and is then re-directed upward under the food product (81d). The turbulent mushroom shaped pressure area refers to the airflow cooking the underneath side of a food product and does not in any manner refer to the airflow on the top surface as depicted by the examiner's notation.

The airflow as depicted by the examiner is actually "diffused" air and is otherwise spent (lost its heating value) and is on its way back to the heater for re-heating. The spacing of the return air paths is such that this air moves back without interfering with any other return air or with any of the impingement jets (see also Fig. III) for illustration of airflow.

Although the examiner has provided applicant with Fig. 8 of Smith (with Examiner's notation), this representation is a two dimensional view of the airflow. Examiner has incorrectly assumed the diffused or spent airflow

depicted at the arrowhead is actual collision of airflow. Applicant directs Examiner's attention to the various other FIGS. of Smith. For example, FIG. III illustrates all return airflows as **non-colliding** airflow. Additionally, as can be seen in FIGS. III & XIII, the jets/nozzles are not shown to be side by side but rather staggered throughout the jet plate. Again, it is important to the Smith invention that return airflow not impact or interfere with jet impingement and that collision between jets is to be avoided by utilization of proper jet/nozzle spacing and proper spacing of return air paths. As described, col. 8 lines 18-24

"The jets are arranged in pattern such as that shown in FIG. III so that air from one jet can return to the blower without passing under another jet. The spacing between columnar or lineal jets is over twice the minimum width of the jet so that the proper return air space is provided between the discrete jets so that returning air does not interfere with successive jets." Smith therefore teaches exactly the opposite as what the examiner "considers" and has noted on Fig. 8 of Smith and cited as basis of rejection.

The collision relied upon by examiner in examiner's notation is instead airflow returning from each of jets 81a, 81b and 81c. Specifically, the return airflow from the right side of jet 81b (after jet 81b impinges against food product P) does not collide with the airflow from jet 81c (after jet 81c impinges against food product P) as the examiner considers, but instead each of these two airflows move back to the blower in spaced apart openings as described throughout Smith.

Examiner states "In regard to at least claim 96, see heating elements (50)." Applicant's invention is not limited to utilization of Calrod heating elements (column 6, line 42).

Examiner states: "In regard to at least claim 97, 100, 102, 103, 107 and 108, blower motor (94) for controlling the air flow is described as a "variable speed motor" (see col. 9, lines 45-46) and the velocity of the jets (81) may be optimized/adjustable damped (see col. 9, lines 9-11) for controlling the heating

of the food to provide "very rapid heat transfer" (col. 10, lines 47-48)."

Applicant respectfully disagrees. The motor (94) referenced by examiner refers to a motor to control the movement of the jets relative to the food product. Applicant's variable speed motor controls the velocity of the airflow. Applicant has searched column 9 and cannot find examiner's reference to optimized/adjustable damped. Applicant finds no reference to optimized/adjustable damped for controlling the heating of the food to provide "very rapid heat transfer" in col. 10 lines 47-48.

Examiner states that "In regard to claim 98, applicant has shown that Smith refers to colliding impingement gas against the surface of a food product. Applicant's again states that the collision of gas directed from one side of the oven cavity with gas directed from an opposing side of the oven cavity causes the high heat transfer to the food product and not the impingement style heat transfer of Smith. There are no "multiple impingement points" with applicant's invention. Indeed applicant's invention is dramatically different than Smith because it utilizes no impingement cooking whatsoever. Gas is mixed prior to contacting the food product surface. With Smith, each discrete jet is designed to stay tightly compacted until it reaches the food product surface.

Examiner states that "In regard to at least claim 99, see at least Figs. 2 and 8 and note that air is provided to the cooking chamber via plenums (82 or 122) and exhausted from the cooking chamber (note arrows in each Fig showing air passed from the cooking chamber.)" Applicant respectfully disagrees. Air is provided via conduits and not through plenums as provided by Smith.

Examiner states that "In regard to claim 101, multiple/additional means are provided for directing gas (Figs. 2 or 8)." Applicant submits amended claim 101.

Rejections Under 35 U.S.C. § 103.

Amendment
Serial No. 10/614,532
Page 15

6. Claims 110-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,409,453 to Smith ("Smith") in view of U.S. Patent No. 5,166,487 to Hurley et al ("Hurley"). Examiner states that "Smith discloses substantially all the limitations of claims 110-116 (note discussion of this reference above) with the possible exception of directing microwave energy from the opposing side of the cooking chamber."

Applicant agrees with the examiner that Smith does not disclose directing microwave energy from the opposing sides of the cooking chamber. With reference to the remainder of the examiner's rejections concerning Smith, please refer to previous discussion herein.

Examiner states that "Further, in regard to claims 112-114, as shown in Figs. 6 and 8, while the gas jets (81) are initially shown directed at an angle of approximately 90 degrees, prior to striking the surface of the food product the angle of the gas jets is shown at an angle of less than 90 degrees from horizontal thus meeting applicant's claim limitations. Alternatively, the embodiment of Smith's invention shown in Figs. 12-18 shows plates (385) with air jets (390) that are oriented at an angle and thus less than 90 degrees from horizontal in order to form an area of coverage that overlaps to progressively cook the entire surface of food product (P) (see col. 14, lines 31-34). It would be obvious to a person of ordinary skill in the art to incorporate the angled air injection of the second embodiment of Smith in the first embodiment to desirable form this area coverage that overlaps to progressively cook the entire surface of food product (P).

Applicant again respectfully disagrees. Figs. 6-8 depict an angle of 90 degrees to horizontal. The references applicant has located (col. 14, lines 10-15) describe a 90 degree, or substantially 90 degree to horizontal angle between the column of heated air and the food product. In fact, the nozzle angles shown in Fig 15 of Smith are slightly divergent as referenced from the centerline of the air channel and as such the impingement jets on either side of the centerline of the air channel and can never collide. Again, this highlights Smiths teaching of discrete jets impinging on the food product.

Claims 112-114 depend upon claim 110 which describes directing heated gas from the opposing sides of the cooking chamber such that the heated gas collides in close

proximity to the food product. Therefore collision of the gas with itself is required. Applicant submits that any angle less than 90 degrees that will accomplish such collision is allowable. Applicant specifically did not claim 90 degrees because 90 degrees is, for all practical purposes, impingement style cooking.

Examiner states that "In regard to claim 115, again note the velocity range of 500 to 7,000 feet per minute (see col. 9, lines 5-6). Applicant again respectfully disagrees. Applicant is colliding opposing gas flows. Smith impinges gas against the surface of the food product and collision of gas flows is to be avoided. Therefore applicant's ranges refer to collision of gas flows and are not anticipated or taught by Smith.

Examiner states that "In regard to claim 116, as shown at least in Fig. 7, the opening at the top right side of the combustion chamber receiving exhaust air is considered an opening at the top of the cooking chamber as recited.

Applicant respectfully disagrees. Fig. 2 and col. 8, lines 53-55 and 62 describe a return air duct in the back wall of the cooking chamber through which air is re-circulated. Opening 36, Fig. 11 is towards the lower portion of the back wall and nowhere near the top of oven 1. Applicant's invention exhausts airflow through the top wall of the oven, a very advantageous improvement. This is possible because there are no impingement jet plates on the top wall of the oven as with Smith. Since heated airflow rises, applicant's invention works well with the laws of physics, an advantage over the previous art.

Examiner states that "Hurley teaches a cooking method in the same field of endeavor as both applicant's invention and Smith. In Hurley, a cooking oven functions to provide convective and microwave heating (see abstract). The microwave heating is enabled by multiple microwave generating magnetrons (12 and 14) that are desirable arranged at "opposite ends of the cooking chamber" (see col. 5, lines 54-55) to direct microwave energy (15) to a food product. Therefore in regard to claims 110-116, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the cooking method of Smith to incorporate directing microwave energy at opposite sides of the cooking chamber as taught in Hurley as this location is expressly recognized in the art as desirable for directing microwave energy to a food product (see

Hurley, col. 5, lines 47-55)."

Applicant respectfully disagrees. Hurley requires mechanical stirrers in order to propagate microwave energy throughout the cooking chamber. Applicant's invention requires no stirring mechanism, indeed no moving parts whatsoever in order to properly and optimally distribute microwave energy for even and consistent cooking. This is a significant advantage.

Conclusion

Applicant requests that the Examiner allow claims 95-116 and that a patent containing these claims issue in due course.

Respectfully submitted,



Dean W. Russell

Reg. No. 33,452

Attorney for the Assignee